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THIRD QUARTER GROUNDWATER MONITORING PLAN LETTER REPORT FOR BUILDING  
189 TRUMAN ANNEX NAS KEY WEST FL  
4/16/1999  
TETRA TECH NUS

**TETRA TECH NUS, INC.**

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TtNUS/DFB-99-013/7846-7.2.3

16 April, 1999

Project Number 7846

Jorge R. Caspary, P.G.  
Remedial Project Manager  
Technical Review/Federal Facilities  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

## Q A Record

**Reference:** Clean Contract No. N62467-94-D0888  
Contract Task Order No. 0059

**Subject:** Third Quarter Groundwater Monitoring Plan Letter Report  
Building 189, Truman Annex, Naval Air Station,  
Key West, Florida

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit the Groundwater Monitoring Report for the referenced Contract Task Order (CTO). This report has been prepared for the U.S. Navy Southern Division Naval Facilities Engineering Command under CTO-059, for the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N62467-94-D-0888.

**Monitoring Objectives.** The objective of the quarterly groundwater monitoring program at Site 189 is to evaluate the contaminant plume stability and monitor product recovery efforts until cleanup levels are achieved. The monitoring program, contaminants of concern, and target concentrations are presented in the Remedial Action Plan (RAP) for Berthing Wharf Building 189 (ABB-ES, 1994). In 1997, however, the Florida Department of Environmental Protection (FDEP) updated Chapter 62-770 of the Florida Administrative Code (FAC). As a result, new chemicals of concern (CoCs) and updated groundwater cleanup target levels (GCTLs) need to be established for Site 189.

The groundwater at the site is classified as a G-III aquifer (McKenzie, 1990). As a result of this classification, the GCTLs for groundwater of low yield/poor quality, as prescribed by Chapter 62-770 FAC, are the appropriate GCTLs. Based on the first two sampling events at Site 189, TtNUS recommends the following list of CoCs and GCTLs:

<u>CoC</u>	<u>GCTL</u>
Benzo(a)anthracene	2 µg/L
Benzo(a)pyrene	2 µg/L
Indeno(123cd)pyrene	2 µg/L
Total Recoverable Petroleum Hydrocarbons (TRPH)	50 mg/L

**Baseline Sampling.** Activities and results from the baseline groundwater sampling event and first quarter of free product monitoring at NAS Key West, Site 189, are detailed in the first quarter monitoring report submitted to the FDEP on November 2, 1998.

**First Quarter Monitoring.** Activities and results from the first quarter of free product monitoring and first quarter groundwater sampling event at NAS Key West, Site 189, are detailed in the first quarter monitoring report submitted to the FDEP on November 2, 1998.

**Second Quarter Monitoring.** Activities and results from the second quarter of free product monitoring and second quarter groundwater sampling event at NAS Key West, Site 189, are detailed in the second quarter monitoring report submitted to the FDEP on January 18, 1999.

### THIRD QUARTER MONITORING

**Free Product Monitoring.** TtNUS personnel visited the site on December 29, 1998, January 29, 1999, and February 23 1999 to perform monthly free product monitoring and recovery. During each of these visits, monitoring wells B189-MW01 B189-MW02, B189-MW03, B189-MW10 and B189-MW11 (see Figure 1, Attachment A) were gauged using an oil/water interface probe. During both visits, globules of free product was observed in monitoring well B189-MW-2, however the thickness was insufficient to be recorded with the oil/water interface probe. TtNUS attempted to bail the product from the well but the viscous nature of the product prevented it from entering the bailer. No reportable quantities (>0.01 feet) of free product were detected in other monitoring wells during the two events. Findings for the two free product monitoring events are summarized in Table 1, Attachment B

**GROUNDWATER MONITORING.** On February 23, 1999 Tetra Tech, NUS, Inc. personnel collected groundwater samples from nine Site 189 monitoring wells (B189-MW01, B189-MW02, B189-MW03, B189-MW04 and B189-MW06, B189-MW07, B189-MW10, B189-MW12 and B189-MW13D). All sample activities were conducted in accordance with TtNUS, FDEP approved, Comp QAP # 980038.

Immediately prior to the collection of the groundwater samples, water level and product measurements were recorded from each site monitoring well. The water level data was used to determine purge volumes. In addition, depth-to-water measurements, along with top of casing elevations, were used to calculate groundwater elevations. Based on these elevations, the groundwater was flowing primarily to the east at the time of the sampling. Figure 2, Attachment A, depicts the groundwater elevations recorded on February 24, 1999. Depth to water measurements, top of casing elevations, and groundwater elevation data are provided in Table 2, Attachment B.

All monitoring wells were purged prior to collection groundwater samples. Purging and sampling were performed with a peristaltic pump using the low flow quiescent method. Water sampling logs, which detail the purge process, are provided in Attachment C.

Following collection of the groundwater samples, the sample bottles were packed on ice and shipped via overnight transport to PC&B Environmental Laboratories in Oviedo, Florida. The groundwater samples were analyzed for compounds specified in the baseline sampling event. The analytical results are summarized in Table 3, Attachment B. A copy of the laboratory report is provided in Attachment D.

TRPH were not detected in the groundwater samples collected during the February 1999 sampling event.

Polynuclear Aromatic Hydrocarbons (PAH) concentrations were detected in the samples collected from monitoring wells B189-MW01, B189-MW02, B189-MW03, B189-MW04, B189-MW10 and B189-MW12. The detected PAHs were benzo(g,h,i)perylene, benzo(k) fluoranthene, chrysene, fluoranthene, fluorene, naphthalene, 2-Methyl Naphthalene, Benzo(a)pyrene, Indeno(123-c,d) pyrene and pyrene. PAH concentrations ranged from 0.35 µg/L to 9.0 µg/L. Concentrations of Benzo(a)pyrene were detected above the GCTL of 2 µg/L in the groundwater collected from monitoring well B189-GW-MW02. All other PAH compounds detected were below their respective GCTLs.

**Conclusions.** PAH compounds were the only chemicals detected in Site 189 groundwater samples. Several PAH compounds were detected in the samples collected this quarter, however only one

Mr. Jorge R. Caspary, P.G.

FDEP

April 16, 1999 – Page 3

compound, benzo (a) pyrene, exceeded GCTLs during this quarterly sampling event. PAH concentrations detected during this quarterly sampling event were slightly above those detected during the previous quarter. Additional monitoring data will be required to make any further conclusions concerning PAHs in Site 189 groundwater.

**Recommendations.** Based on the results of the three sampling events and Section 3.1 of the Site 189 RAP (ABB-ES, 1994), TtNUS recommends that future monitoring at Site 189 include only the following analyses:

USEPA Method 8310 for PAHs

Florida Petroleum Range Organics for TRPH

The next quarterly sampling event is scheduled for May 1999. If you have any questions with regard to this submittal, please contact me at (954) 570-5885.

Very truly yours,

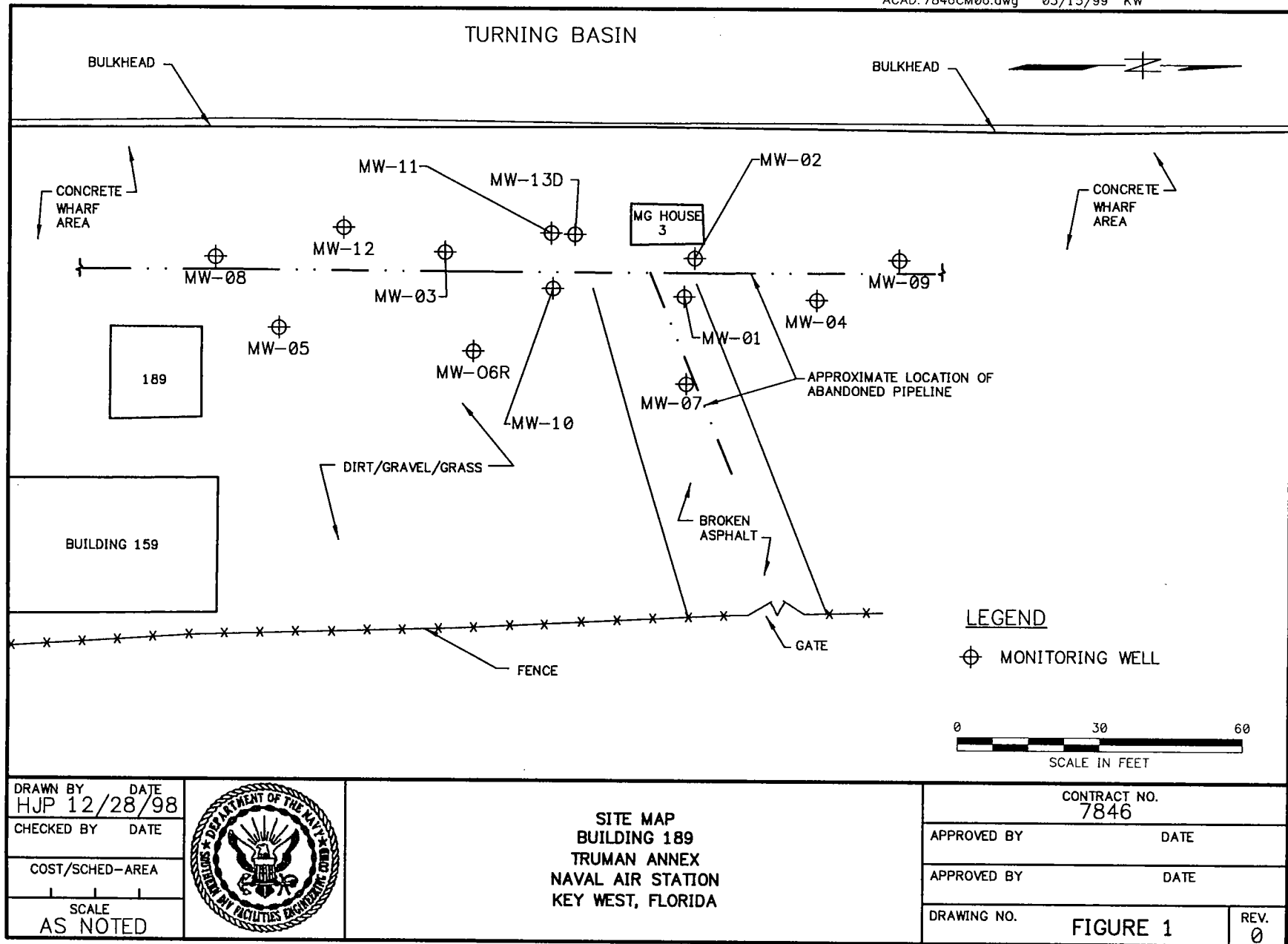
Rick Ofsanko  
Task Order Manager

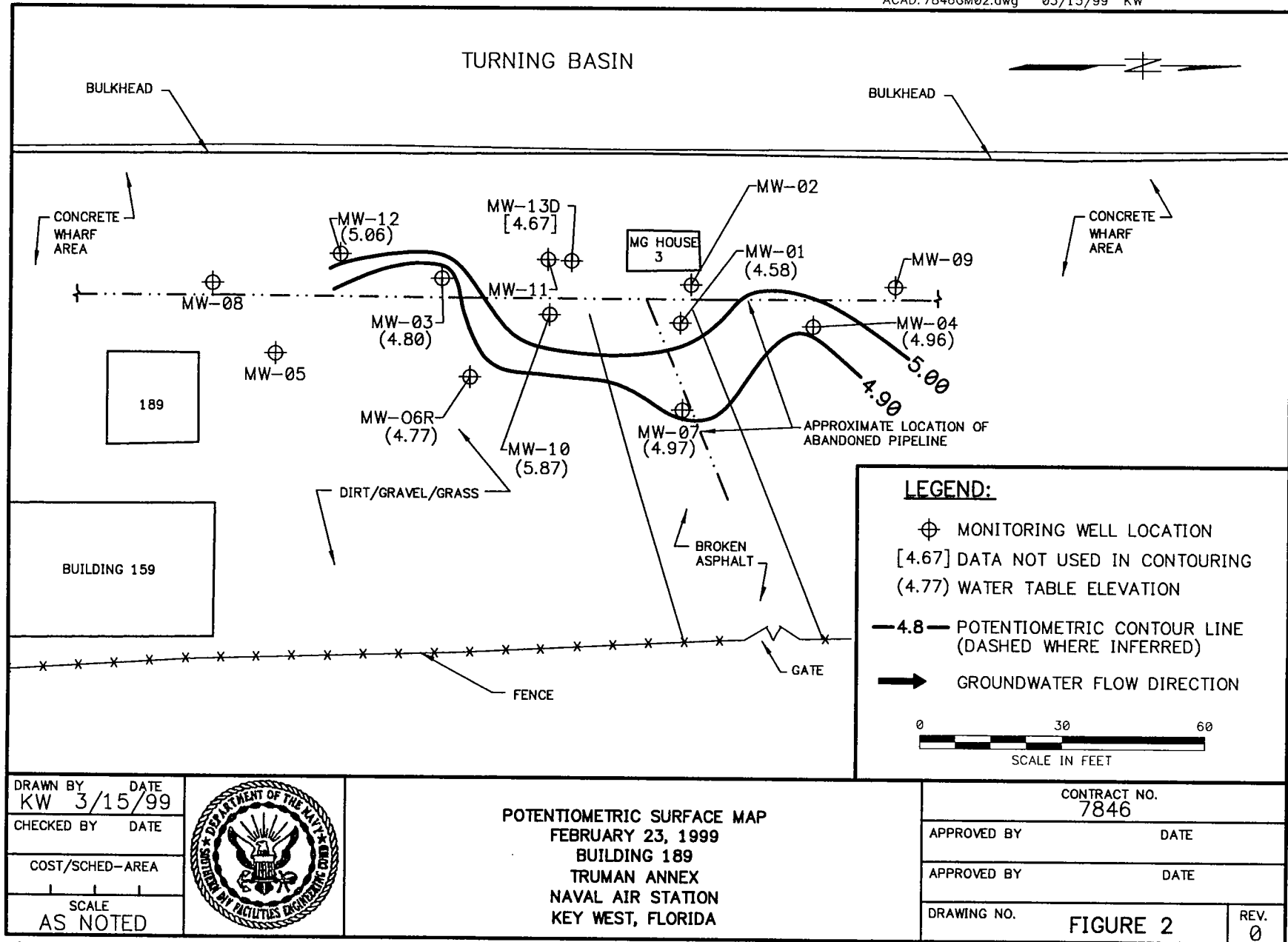
RO/ro

Enclosures

c: B. Glover, SDIV  
D. Evans-Ripley (w/o attachments), SDIV  
D. Wroblewski (w/o attachments), TtNUS  
A. Kendrick, TtNUS  
File

**ATTACHMENT A**





**ATTACHMENT B**

**TABLE 1**  
**FREE PHASE PETROLEUM MEASUREMENTS**  
**Site 189, Truman Annex**  
**Naval Air Station, Key West, Florida**

Field Data	B189-MW02				
	June 27, 1998	July 25, 1998	August 15, 1998	August 24, 1998	September 1, 1998
Depth to Product	unobtainable	5.65 feet	NA	NA	NA
Depth to Groundwater	5.62 feet	5.67 feet	6.02 feet	5.87 feet	5.98 feet
Appearance	sticky globules	dark and sticky	Sheen	sheen	sheen
Apparent Thickness <sup>(2)</sup>	0.10 feet	0.02 feet	<0.01 feet	<0.01 feet	<0.01 feet
Removal Amount <sup>(3)</sup>	5 gallons	8 gallons	0 gallons	0 gallons	0 gallons

Field Data	B189-MW03				
	June 27, 1998	July 25, 1998	August 15, 1998	August 24, 1998	September 1, 1998
Depth to Product	Unobtainable	NA	NA	NA	NA
Depth to Groundwater	5.85 feet	5.43 feet	6.15 feet	5.63 feet	5.75 feet
Appearance	sticky globules	Sheen	NA	sheen	sheen
Apparent Thickness	0.10 feet	<0.01 feet	NA	<0.01 feet	<0.01 feet
Removal Amount	5 gallons	0 gallons	0 gallons	0 gallons	0 gallons

**NOTES:**

<sup>(1)</sup> Apparent thickness is measured or estimated thickness of

<sup>(2)</sup> Removal amount is the approximate amount of free product and groundwater mixture removed from a monitoring well during free product recovery.

NA = not applicable

**TABLE 1 (Continued)**  
**FREE PHASE PETROLEUM MEASUREMENTS**  
**Site 189, Truman Annex**  
**Naval Air Station, Key West, Florida**

Field Data	B189-MW02				
	Oct 23, 1998	Dec 2, 1998	Dec 29, 1998	Feb 23, 1999	
Depth to Product	Unobtainable	5.65 feet	NA	NA	
Depth to Groundwater	5.62 feet	5.67 feet	6.02 feet	5.87 feet	
Appearance	sticky globules	dark and sticky	Sheen	sheen	
Apparent Thickness <sup>(2)</sup>	0.10 feet	0.02 feet	<0.01 feet	<0.01 feet	
Removal Amount <sup>(3)</sup>	5 gallons	8 gallons	0 gallons	0 gallons	

Field Data	B189-MW03				
	Oct 23, 1998	Dec 2, 1998	Dec 29, 1998	Feb 23, 1999	
Depth to Product	No product	No product	No product	No product	
Depth to Groundwater					
Appearance					
Apparent Thickness					
Removal Amount					

**NOTES:**

<sup>(1)</sup> Apparent thickness is measured or estimated thickness of

<sup>(2)</sup> Removal amount is the approximate amount of free product and groundwater mixture removed from a monitoring well during free product recovery.

NA = not applicable

**TABLE 2**  
**TOP OF CASING ELEVATIONS, WATER TABLE ELEVATIONS, AND TOTAL DEPTHS**  
**Site 189, Truman Annex**  
**Naval Air Station, Key West, Florida**

Well ID	Total Depth	Top of Casing Elevation <sup>(1)</sup>	June 27, 1998		October 2, 1998		December 2, 1998	
			Groundwater Level	Groundwater Elevation	Groundwater Elevation	Groundwater Elevation	Groundwater Level	Groundwater Elevation
B189-MW01	12.88	10.00	5.34	4.66	4.95	5.05	5.48	4.52
B189-MW02 <sup>(2)</sup>	13.00	10.74	5.62	5.12	5.87	4.87	6.29	4.45
B189-MW03 <sup>(2)</sup>	12.45	10.52	5.85	4.67	5.95	4.57	6.11	4.41
B189-MW04	12.97	10.91	6.15	4.76	4.39	6.52	6.11	4.80
B189-MW05	12.47	11.04	NM	NM	4.12	6.92	6.06	4.98
B189-MW06R	12.52	9.38	NM	NM	4.79	4.59	4.91	4.47
B189-MW07	12.61	9.08	4.41	4.67	4.08	5.00	4.48	4.60
B189-MW08	NM	10.62	NM	NM	5.72	4.90	NM	NM
B189-MW09	12.88	10.86	NM	NM	5.02	5.84	6.44	4.42
B189-MW10	12.95	10.22	5.21	5.01	5.73	4.49	5.49	4.73
B189-MW11	NM	10.45	NM	NM	5.95	4.50	6.03	4.42
B189-MW12	12.95	10.57	5.88	4.69	6.09	4.48	6.12	4.45
B189-MW13D	36.00	10.52	5.81	4.71	5.35	5.17	6.07	4.45

**NOTES:**

<sup>(1)</sup> Top of casing and groundwater elevations are relative to an arbitrary site reference elevation of 10 feet.

<sup>(2)</sup> Free phase petroleum product was present in both B189-MW02 and B189-MW03. Product measurements were not taken because the product was viscous and adhered to the probe surface.

All measurements reported in feet.

NM – not measured. B189-MW06R had not yet been installed and the original well could not be found.

**TABLE 2**  
**TOP OF CASING ELEVATIONS, WATER TABLE ELEVATIONS, AND TOTAL DEPTHS**  
**Site 189, Truman Annex**  
**Naval Air Station, Key West, Florida**

Well ID	Total Depth	Top of Casing Elevation <sup>(1)</sup>	February 24, 1999	
			Groundwater Level	Groundwater Elevation
B189-MW01	12.88	10.00	5.42	4.58
B189-MW02 <sup>(2)</sup>	13.00	10.74	NM	NM
B189-MW03 <sup>(2)</sup>	12.45	10.52	5.72	4.67
B189-MW04	12.97	10.91	5.95	4.96
B189-MW05	12.47	11.04	NM	NM
B189-MW06R	12.52	9.38	4.61	4.77
B189-MW07	12.61	9.08	4.11	4.97
B189-MW08	NM	10.62	NM	NM
B189-MW09	12.88	10.86	NM	NM
B189-MW10	12.95	10.22	4.35	5.87
B189-MW11	NM	10.45	NM	NM
B189-MW12	12.95	10.57	5.51	5.06
B189-MW13D	36.00	10.52	5.85	4.67

# TABLE 3: GROUNDWATER MONITORING WELL ANALYTICAL SUMMARY

Facility Name: Building 189, Truman Annex, NAS Key West

Facility ID#:

Sample Location	Date	Benzo (k) fluoranthene	Pyrene	Fluorene	Benzo(ghi) perylene	Fluoranthene	Chrysene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Indeno (123cd) pyrene	Naphthalene	TRPHs
Cleanup Target Level(1)		5	2100	300	200	None	350	2	2	2	2	200	50
B189-GW-MW1	6/27/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	1.2	3.10	<0.1	3.40	<0.05	1.3
	9/2/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	12/2/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	2.1	<0.10	<0.05	0.9
	2/23/99	<0.2	<1.0	<1.0	<0.2	<1.0	<0.20	<0.2	<0.25	<0.2	<0.2	3	<0.1
B189-GW-MW2	6/27/98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	9/2/98	<0.2	<1.0	<1.0	<1.0	<1.0	<5.0	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	12/2/98	<0.2	<1.0	<1.0	<1.0	<1.0	<1.0	<0.2	<0.25	<0.2	<0.10	<0.05	6.1
	2/23/99	<0.2	<1.0	<1.0	6.2	3.1	3.84	<0.2	3.04	<0.2	1.4	<0.05	<0.1
B189-GW-MW3	6/27/98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	9/1/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	2/23/99	0.35	5.4	1.5	<0.2	<1.0	<0.20	<0.2	<0.25	<0.2	<0.2	16.4	<0.1
B189-GW-MW4	6/27/98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	9/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	2/23/99	<0.2	<1.0	1.3	<0.2	<1.0	<0.20	<0.2	<0.25	<0.2	<0.2	1.6	<0.1
B189-GW-MW6R	6/27/98	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	9/1/98	<1.0	<1.0	<1.0	<1.0	<1.0	<5.0	<0.2	<0.25	<0.2	<0.10	0.30	<0.1
	12/2/98	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	2/23/99	<0.2	<1.0	<1.0	<0.2	<1.0	<0.20	<0.2	<0.25	<0.2	<0.2	<1.0	<0.1
B189-GW-MW7	6/27/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<1.0	<0.25	<0.2	<0.05	<0.05	<0.1
	9/2/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	12/2/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	2/23/99	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.2	<1.0	<0.1
B189-GW-MW10	6/27/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.1	<0.05	<0.05	1.3
	9/1/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	12/2/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	3.60	<0.2	<0.10	<0.05	1.3
	2/23/99	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.2	9.2	<0.1
B189-GW-MW12	6/27/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<1.0	<0.25	<0.1	<0.05	<0.05	<0.1
	9/2/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	12/2/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	2/23/99	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.2	3.7	<0.1

# TABLE 3: GROUNDWATER MONITORING WELL ANALYTICAL SUMMARY

**Facility Name:** Building 189, Truman Annex, NAS Key West

**Facility ID#:**

Sample Location	Date	Benzo (k) fluoranthene	Pyrene	Fluorene	Benzo(ghi) perylene	Fluoranthene	Chrysene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Indeno (123cd) pyrene	Naphthalene	TRPHs
B189-GW-MW13D	6/27/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<1.0	<0.25	<0.1	<0.05	<0.05	<0.1
	9/1/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	12/2/98	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.10	<0.05	<0.1
	2/23/99	<0.2	<1.0	<1.0	<0.2	<1.0	<0.2	<0.2	<0.25	<0.2	<0.2	<1.0	<0.1

**NOTES:**

(1)Groundwater cleanup target levels as specified in Table VIII of Chapter 62-770, Florida Administrative Code.

NA = not analyzed.

TRPH = total recoverable petroleum hydrocarbons.

Concentrations reported in micrograms per liter for all chemicals except TRPH. TRPH is reported in milligrams per liter.

**ATTACHMENT C**

# Brown & Root Environmental

900 Trail Ridge Road

Alken, SC 29803

(803) 649-7963

Fax: (803) 642-8454

## GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B199-MW002 GW-0 Project: NAS Key West BRAC SI

Project Number: 7593

Zone: Building 189

Subzone: \_\_\_\_\_

Airbill No: \_\_\_\_\_

Laboratory: GEL

Total Depth (ft):	<u>12.52'</u>
Stickup Height (ft):	<u>FLUSH</u>
Casing Diameter (ID-Inches):	<u>3'</u>
Static Water Level (ft below top of casing):	<u>4.61</u>
One Casing Volume (gal):	<u>1.3</u>
Start Purge (hrs.):	<u>0907</u>
End Purge (hrs.):	<u>0956</u>
Total Purge Time (min.):	<u>49</u>
Total Amount Purged (gal):	<u>4 gal</u>
Purge Method:	<u>low flow &lt; 300 ml/min peristaltic pump</u>
Sample Method:	<u>low flow peristaltic pump</u>
Depth Sampled:	<u>~5'</u>
Sample Date:	<u>2/24/99</u>
Sample Time:	<u>0957</u>

### Type of Screening Sample:

- ☐ DPT Borehole  
☒ Existing Monitoring Well  
☐ HSA Temporary Well

### Type of Sample:

- ☐ Low Concentration  
☐ High Concentration  
☒ Grab  
☐ Composite  
☐ Grab-Composite

Duplicate ID:

MS/MSD:

YES ☐

NO ☒

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here)

3 vol = 4 gal

### ANALYSES: HTKO, 8310

TCL VOCs (HCL Preservative): YES <input type="checkbox"/> NO <input type="checkbox"/>	Bottle Lot Number: _____
TCL SVOCs: YES <input type="checkbox"/> NO <input type="checkbox"/>	Bottle Lot Number: _____
TCL PESTs: YES <input type="checkbox"/> NO <input type="checkbox"/>	Bottle Lot Number: _____
TCL PCBs: YES <input type="checkbox"/> NO <input type="checkbox"/>	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative): YES <input type="checkbox"/> NO <input type="checkbox"/>	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0913	0.25	23.4	7.87	2.86	1		clear
0923	1.0	23.4	7.59	3.47			
0932	2.0	25.1	7.49	3.93			
0938	2.5	25.2	7.49	3.95			
0944	3.0	25.2	7.47	4.04			
0950	3.5	25.3	7.48	4.09			
0956	4.0	25.4	7.47	4.12			
							✓

Sampled By: ESH

Signature(s): E. J. Hanning

# Brown & Root Environmental

900 Trail Ridge Road

Alken, SC 29803

(803) 649-7963

Fax: (803) 642-8454

## GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B-189-MW02 Project: NAS Key West BRAC SI

Project Number: 7593

Zone: \_\_\_\_\_

Subzone: \_\_\_\_\_

Airbill No: \_\_\_\_\_

Laboratory: GEL

Total Depth (ft):	<u>13.00</u>
Stickup Height (ft):	<u>Flush</u>
Casing Diameter (ID-inches):	<u>2"</u>
Static Water Level (ft below top of casing):	<u>6.30</u>
One Casing Volume (gal):	<u>1.13</u>
Start Purge (hrs.):	<u>1015</u>
End Purge (hrs.):	<u>1100</u>
Total Purge Time (min.):	<u>45</u>
Total Amount Purged (gal):	<u>3.5</u>
Purge Method:	<u>Geo Pump</u>
Sample Method:	<u>Geo Pump</u>
Depth Sampled:	<u>8-9'</u>
Sample Date:	<u>02/24/99</u>
Sample Time:	<u>1100</u>

### Type of Screening Sample:

- ☐ DPT Borehole  
☐ Existing Monitoring Well  
☐ HSA Temporary Well

### Type of Sample:

- ☐ Low Concentration  
☐ High Concentration  
☒ Grab FLA PRO  
☐ Composite 8310  
☐ Grab-Composite

Duplicate ID: \_\_\_\_\_

MS/MSD: YES ☐ NO ☒

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

DARK THICK PRODUCT  
TRIED TO BAIL RECOVERED  
VERY LITTLE.  
6.25 TOP OF PRODUCT  
6.30 TOP OF WATER

### ANALYSES:

TCL VOCs (HCL Preservative): YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_  
TCL SVOCs: YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_  
TCL PESTs: YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_  
TCL PCBs: YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_  
TAL Metals + Tin (HNO3 Preservative): YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
<u>1015</u>	<u>.2</u>	<u>25.7</u>	<u>7.48</u>	<u>8.60</u>	<u>1.01</u>	<u>51</u>	<u>clear</u>
<u>1025</u>	<u>1.2</u>	<u>25.5</u>	<u>7.48</u>	<u>10.6</u>	<u>1.05</u>	<u>4</u>	<u>clear</u>
<u>1035</u>	<u>2.4</u>	<u>25.5</u>	<u>7.48</u>	<u>12.9</u>	<u>1.16</u>	<u>3</u>	<u>clear</u>
<u>1045</u>	<u>3.5</u>	<u>25.4</u>	<u>7.49</u>	<u>13.9</u>	<u>1.21</u>	<u>2</u>	<u>clear</u>

Sampled By: \_\_\_\_\_ Signature(s): \_\_\_\_\_

# Brown & Root Environmental

900 Trail Ridge Road

Aiken, SC 29803

(803) 649-7963

Fax: (803) 642-8454

## GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B189 MW 04 Project: NAS Key West BRAC SIProject Number: 7593

Zone: \_\_\_\_\_

Subzone: \_\_\_\_\_

Airbill No: \_\_\_\_\_

Laboratory: GEL

Total Depth (ft):	<u>12.97</u>
Stickup Height (ft):	<u>Flush</u>
Casing Diameter (ID-Inches):	<u>2"</u>
Static Water Level (ft below top of casing):	<u>5.95</u>
One Casing Volume (gal):	
Start Purge (hrs.):	<u>0840</u>
End Purge (hrs.):	<u>0915</u>
Total Purge Time (min.):	<u>35</u>
Total Amount Purged (gal):	<u>3.6</u>
Purge Method:	<u>geo pump</u>
Sample Method:	<u>geo pump</u>
Depth Sampled:	
Sample Date:	<u>022499</u>
Sample Time:	<u>0915</u>

**Type of Screening Sample:**

- ☐ DPT Borehole  
☐ Existing Monitoring Well  
☐ HSA Temporary Well

Duplicate ID: \_\_\_\_\_

**Type of Sample:**

- ☐ Low Concentration  
☐ High Concentration  
☒ Grab B310 FLA Pro  
☐ Composite  
☐ Grab-Composite

MS/MSD: YES ☐ NO ☒

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

**ANALYSES:**TCL VOCs (HCL Preservative): YES ☐ NO ☐TCL SVOCs: YES ☐ NO ☐TCL PESTs: YES ☐ NO ☐TCL PCBs: YES ☐ NO ☐TAL Metals + Tin (HNO3 Preservative): YES ☐ NO ☒

Bottle Lot Number: \_\_\_\_\_

Bottle Lot Number: \_\_\_\_\_

Bottle Lot Number: \_\_\_\_\_

Bottle Lot Number: \_\_\_\_\_

Bottle Lot Number: \_\_\_\_\_

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0843	.2	25.3	7.13	6.68	1.21	2	clear
0855	1.2	25.5	7.26	6.54	.93	2	clear
0900	2.4	25.4	7.35	6.63	1.34	0	clear
0915	3.6	25.5	7.32	6.59	1.04	-3	clear

Sampled By: BRBSignature(s): [Signature]

# Brown & Root Environmental

900 Trail Ridge Road

Aiken, SC 29803

(803) 649-7963

Fax: (803) 642-8454

## GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B189-MW07-GW-01 Project: NAS Key West BRAC SI

Project Number: 7593

Zone: MW-7 BUILDING 189

Subzone: \_\_\_\_\_

Airbill No: \_\_\_\_\_

Laboratory: GEL

Total Depth (ft):	<u>12.61</u>
Stickup Height (ft):	<u>4.5' 0'</u>
Casing Diameter (ID-Inches):	<u>2"</u>
Static Water Level (ft below top of casing):	<u>4.11'</u>
One Casing Volume (gal):	<u>1.45</u>
Start Purge (hrs.):	<u>13:11</u>
End Purge (hrs.):	<u>14:08</u>
Total Purge Time (min.):	<u>57</u>
Total Amount Purged (gal):	<u>4.5</u>
Purge Method:	<u>low flow peristaltic pump</u>
Sample Method:	<u>low flow peristaltic pump</u>
Depth Sampled:	<u>4.5'</u>
Sample Date:	<u>2/23/99</u>
Sample Time:	<u>14:08</u>

Type of Screening Sample:		Type of Sample:	
<input type="checkbox"/> DPT Borehole	<input type="checkbox"/> Existing Monitoring Well	<input type="checkbox"/> Low Concentration	<input type="checkbox"/> High Concentration
<input checked="" type="checkbox"/> HSA Temporary Well	<input checked="" type="checkbox"/> Grab	<input type="checkbox"/> Composite	<input type="checkbox"/> Grab-Composite
Duplicate ID: _____			
MS/MSD: YES <input type="checkbox"/> NO <input type="checkbox"/>			

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

3 casing vol = 4.3 gal

ANALYSES: <u>- FLPRO, EPA 8310</u>			
TCL VOCs (HCL Preservative): YES <input type="checkbox"/> NO <input type="checkbox"/>	Bottle Lot Number: _____		
<del>TCL SVOCs: YES <input type="checkbox"/> NO <input type="checkbox"/></del>	<del>Bottle Lot Number: _____</del>		
<del>TCL PESTs: YES <input type="checkbox"/> NO <input type="checkbox"/></del>	<del>Bottle Lot Number: _____</del>		
<del>TCL PCBs: YES <input type="checkbox"/> NO <input type="checkbox"/></del>	<del>Bottle Lot Number: _____</del>		
TAL Metals + Tin (HNO3 Preservative): YES <input type="checkbox"/> NO <input type="checkbox"/>	Bottle Lot Number: _____		

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
13:20	0.75	26.1	7.85	17.0			new
13:30	1.5	25.9	7.87	16.9			
13:39	2.0	25.8	7.84	16.7			
13:49	3.0	25.6	7.86	16.8			
13:57	3.75	26.0	7.86	16.7			
14:08	4.5	25.6	7.85	14.8			

Sampled By: EJH

Signature(s): Ej J. Hannon

# Brown & Root Environmental

900 Trail Ridge Road

Alken, SC 29803

(803) 649-7963

Fax: (803) 642-8454

## GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B189-MW106WTD Project: NAS Key West BRAC SI

Project Number: 7593

Zone: BUILDING

Subzone: \_\_\_\_\_

Airbill No: 189

Laboratory: GEL

Total Depth (ft):	<u>12.95</u>
Stickup Height (ft):	<u>FEEL - 0'</u>
Casing Diameter (ID-inches):	<u>2"</u>
Static Water Level (ft below top of casing):	<u>4.35'</u>
One Casing Volume (gal):	<u>1.46</u>
Start Purge (hrs.):	<u>14:45</u>
End Purge (hrs.):	<u>15:27</u>
Total Purge Time (min.):	<u>43</u>
Total Amount Purged (gal):	<u>4.5</u>
Purge Method:	<u>low flow</u> <u>peristaltic pump</u>
Sample Method:	<u>low flow</u> <u>peristaltic pump</u>
Depth Sampled:	<u>4.5</u>
Sample Date:	<u>2/23/99</u>
Sample Time:	<u>19:27</u>

### Type of Screening Sample:

- ☐ DPT Borehole  
☒ Existing Monitoring Well  
☐ HSA Temporary Well

### Type of Sample:

- ☐ Low Concentration  
☐ High Concentration  
☒ Grab  
☐ Composite  
☐ Grab-Composite

Duplicate ID: \_\_\_\_\_

MS/MSD: YES ☐ NO ☐

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here)

3 casing = 4.4 gal

### ANALYSES: - FTRO, 8310

TCL VOCs (HCL Preservative): YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_  
TCL SVOCs: YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_  
TCL PESTs: YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_  
TCL PCBs: YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_  
TAL Metals + Tin (HNO3 Preservative): YES ☐ NO ☐ Bottle Lot Number: \_\_\_\_\_

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
<u>14:52</u>	<u>0.5</u>	<u>25.4</u>	<u>8.80</u>	<u>13.0</u>			<u>clear</u>
<u>15:00</u>	<u>1.5</u>	<u>25.6</u>	<u>8.91</u>	<u>12.9</u>			
<u>15:08</u>	<u>2.5</u>	<u>26.2</u>	<u>8.95</u>	<u>12.9</u>			
<u>15:16</u>	<u>3.5</u>	<u>26.2</u>	<u>8.96</u>	<u>13.0</u>			
<u>15:27</u>	<u>4.5</u>	<u>26.1</u>	<u>8.97</u>	<u>13.1</u>			

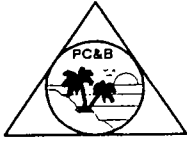
Sampled By: EJH

Signature(s): [Signature]

Fax: (803) 642-8454

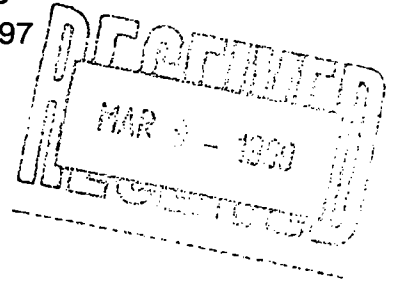
**Signature(s):**

**ATTACHMENT D**



## PC&B Environmental Laboratories, Inc.

210 Park Road, Oviedo, Florida 32765  
Phone: 407-359-7194 Fax: 407-359-7197



03-05-1999

Rick Olsanko  
Tetra Tech NUS, Inc.  
1311 Executive Center Drive, Ste. 220  
Tallahassee, FL 32301-

Dear Rick Olsanko:

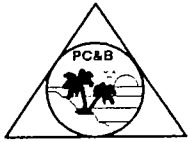
Enclosed are the results of the analysis of your samples received 02/25/1999.

Our laboratory is certified by the Florida DHRS (Lab #E83239) and operates under an FDEP approved Comprehensive Quality Assurance Plan (#900134G). Unless otherwise noted, all results are reported as received. All data were determined in accordance with published procedures (EPA-600/4-79-020), Methods for Chemical Analysis of Water and Wastes, Revised March 1983 and/or Standard Methods for the examination of Water and Wastewater, 18th Edition 1989 and/or Test Methods for Evaluating Solid Waste (EPA-SW-846, Revised January 1995), unless stated otherwise in our CompQapp under method modifications.

If you have any questions, please do not hesitate to give me a call.

Sincerely,

  
Beckie J. Burdick  
Laboratory Manager



## PC&B Environmental Laboratories, Inc.

210 Park Road, Oviedo, Florida 32765  
Phone: 407-359-7194 Fax: 407-359-7197

Client : Tetra Tech NUS, Inc.  
1311 Executive Center Drive, Ste. 220  
Tallahassee, FL 32301-

Contact : Rick Olsanko  
Phone : (850) 656-5458

**Laboratory Reference Number : 99020249**

Project Name : Truman Annex Bld. 189

Project Number : 7846

Chain of Custody : 13653

Sample temperature at time of receipt: 4 degrees C

Laboratory ID	Matrix	Client ID	Status	Date/Time Sampled
99020249-1	Water	B189-MW13D-GW-01	RUN	02/23/1999 10:20
99020249-2	Water	B189-MW03-GW-01	RUN	02/23/1999 11:55
99020249-3	Water	B189-MW12-GW-01	RUN	02/23/1999 12:55
99020249-4	Water	B189-MW01-GW-01	RUN	02/23/1999 13:50
99020249-5	Water	B189-MW07-GW-01	RUN	02/23/1999 14:08
99020249-6	Water	B189-DUP1-GW-01	RUN	02/23/1999
99020249-7	Water	B189-MW10-GW-01	RUN	02/23/1999 15:27
99020249-8	Water	B189-MW04-GW-01	RUN	02/24/1999 09:15
99020249-9	Water	B189-MW06R-GW-01	RUN	02/24/1999 09:57
99020249-10	Water	B189-EQPBLK-01	ON HOLD	02/24/1999 11:00
99020249-11	Water	B189-MW02-GW-01	RUN	02/24/1999 11:00

Number	Parameter	Description
10	EPA 8310	PAH's by HPLC
10	FL-PRO	Petroleum Hydrocarbons

# PC&B Environmental Laboratories, Inc.

210 Park Road  
Oviedo, FL 32765  
407-359-7194 - (FAX) 359-7197

## Case Narrative

Rick Olsanko  
Tetra Tech NUS, Inc.  
1311 Executive Center Drive, Ste. 220  
Tallahassee, FL 32301-

CASE NARRATIVE for Work Order: 99020249  
Project Number: 7846  
Project Name: Truman Annex Bld. 189

This Case Narrative is a summary of events and/or problems encountered with this Work Order.

No problems encountered with this work order.

### Definition of Flags

DL	=	No surrogate result due to dilution or matrix interference.
J	=	Estimated Value, value not accurate.
L	=	Off-scale high. Actual value is greater than value given.
Q	=	Sample held beyond the accepted holding time.
T	=	Value reported is less than the laboratory method detection limit.
V	=	Analyte was both detected in the method blank and sample.

## QC Batch Summary

Rick OlfSanko  
Tetra Tech NUS, Inc.  
1311 Executive Center Drive, Ste. 220  
Tallahassee, FL 32301-

QC BATCH SUMMARY for Work Order: 99020249  
Project Number: 7846  
Project Name: Truman Annex Bld. 189

Method	SubNum	QC Batch
<b>EPA 8310 - PAH's by HPLC</b>		
	-1	9902PAH135
	-2	9902PAH135
	-3	9902PAH135
	-4	9902PAH135
	-5	9903PAH003
	-6	9903PAH003
	-7	9903PAH003
	-8	9903PAH003
	-9	9903PAH003
	-11	9903PAH003
<b>FL-PRO - Petroleum Hydrocarbons</b>		
	-1	9903FLRO008
	-2	9903FLRO008
	-3	9903FLRO008
	-4	9903FLRO008
	-5	9903FLRO008
	-6	9903FLRO008
	-7	9903FLRO008
	-8	9903FLRO008
	-9	9903FLRO008
	-11	9903FLRO008

PC&B Environmental Laboratories, Inc.  
210 Park Road  
Oviedo, FL 32765  
PHONE: 407-359-7194  
FAX: 359-7197

PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

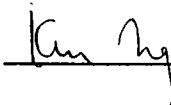
Lab Reference Number : 99020249-1  
Client Sample ID : B189-MW13D-GW-01  
Date Sampled : 02/23/1999  
Date Extracted : 02/25/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	0.25 U	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	0.2 U	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.25 U	ug/l	ELA
0.20	Chrysene	0.20 U	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	1.0 U	ug/l	ELA
1.0	Fluorene	1.0 U	ug/l	ELA
0.2	Indeno(123cd)pyrene	0.2 U	ug/l	ELA
1.0	Naphthalene	1.0 U	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	1.0 U	ug/l	ELA

U = Undetected. The value preceding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by :



PC&B Environmental Laboratories, Inc.  
210 Park Road  
Oviedo, FL 32765  
PHONE: 407-359-7194  
FAX: 359-7197

PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

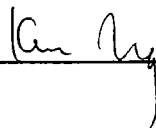
Lab Reference Number : 99020249-2  
Client Sample ID : B189-MW03-GW-01  
Date Sampled : 02/23/1999  
Date Extracted : 02/25/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	0.25 U	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	0.2 U	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.35	ug/l	ELA
0.20	Chrysene	0.20 U	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	1.0 U	ug/l	ELA
1.0	Fluorene	1.5	ug/l	ELA
0.2	Indeno(123cd)pyrene	0.2 U	ug/l	ELA
1.0	Naphthalene	7.4	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	9.0	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	5.4	ug/l	ELA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRs Certification # E83239/83353

Reviewed by :



PC&B Environmental Laboratories, Inc.  
210 Park Road  
Oviedo, FL 32765  
PHONE: 407-359-7194  
FAX: 359-7197

PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

Lab Reference Number : 99020249-3  
Client Sample ID : B189-MW12-GW-01  
Date Sampled : 02/23/1999  
Date Extracted : 02/25/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	0.25 U	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	0.2 U	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.25 U	ug/l	ELA
0.20	Chrysene	0.20 U	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	1.0 U	ug/l	ELA
1.0	Fluorene	1.0 U	ug/l	ELA
0.2	Indeno(123cd)pyrene	0.2 U	ug/l	ELA
1.0	Naphthalene	1.0 U	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	3.7	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	1.0 U	ug/l	ELA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : 

PC&B Environmental Laboratories, Inc.  
210 Park Road  
Oviedo, FL 32765  
PHONE: 407-359-7194  
FAX: 359-7197

PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

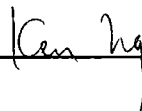
Lab Reference Number : 99020249-4  
Client Sample ID : B189-MW01-GW-01  
Date Sampled : 02/23/1999  
Date Extracted : 02/25/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	0.25 U	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	0.2 U	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.25 U	ug/l	ELA
0.20	Chrysene	0.20 U	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	1.0 U	ug/l	ELA
1.0	Fluorene	1.0 U	ug/l	ELA
0.2	Indeno(123cd)pyrene	0.2 U	ug/l	ELA
1.0	Naphthalene	3.0	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	4.5	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	1.0 U	ug/l	ELA

U = Undetected. The value preceding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by :



PC&B Environmental Laboratories, Inc.  
210 Park Road  
Oviedo, FL 32765  
PHONE: 407-359-7194  
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PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

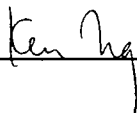
Lab Reference Number : 99020249-5  
Client Sample ID : B189-MW07-GW-01  
Date Sampled : 02/23/1999  
Date Extracted : 03/01/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	0.25 U	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	0.2 U	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.25 U	ug/l	ELA
0.20	Chrysene	0.20 U	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	1.0 U	ug/l	ELA
1.0	Fluorene	1.0 U	ug/l	ELA
0.2	Indeno(123cd)pyrene	0.2 U	ug/l	ELA
1.0	Naphthalene	1.0 U	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	1.0 U	ug/l	ELA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRs Certification # E83239/83353

Reviewed by :



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Oviedo, FL 32765  
PHONE: 407-359-7194  
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PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

Lab Reference Number : 99020249-6  
Client Sample ID : B189-DUP1-GW-01  
Date Sampled : 02/23/1999  
Date Extracted : 03/01/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	0.25 U	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	0.2 U	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.25 U	ug/l	ELA
0.20	Chrysene	0.20 U	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	1.0 U	ug/l	ELA
1.0	Fluorene	1.0 U	ug/l	ELA
0.2	Indeno(123cd)pyrene	0.2 U	ug/l	ELA
1.0	Naphthalene	2.7	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	1.0 U	ug/l	ELA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : 

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PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

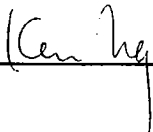
Lab Reference Number : 99020249-7  
Client Sample ID : B189-MW10-GW-01  
Date Sampled : 02/23/1999  
Date Extracted : 03/01/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	0.25 U	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	0.2 U	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.25 U	ug/l	ELA
0.20	Chrysene	0.20 U	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	1.0 U	ug/l	ELA
1.0	Fluorene	1.0 U	ug/l	ELA
0.2	Indeno(123cd)pyrene	0.2 U	ug/l	ELA
1.0	Naphthalene	5.1	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	4.1	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	1.0 U	ug/l	ELA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

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PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

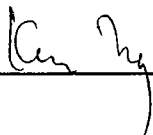
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Client Sample ID : B189-MW04-GW-01  
Date Sampled : 02/24/1999  
Date Extracted : 03/01/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	0.25 U	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	0.2 U	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.25 U	ug/l	ELA
0.20	Chrysene	0.20 U	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	1.0 U	ug/l	ELA
1.0	Fluorene	1.3	ug/l	ELA
0.2	Indeno(123cd)pyrene	0.2 U	ug/l	ELA
1.0	Naphthalene	1.6	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	1.0 U	ug/l	ELA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by :



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PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

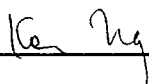
Lab Reference Number : 99020249-9  
Client Sample ID : B189-MW06R-GW-01  
Date Sampled : 02/24/1999  
Date Extracted : 03/01/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	0.25 U	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	0.2 U	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.25 U	ug/l	ELA
0.20	Chrysene	0.20 U	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	1.0 U	ug/l	ELA
1.0	Fluorene	1.0 U	ug/l	ELA
0.2	Indeno(123cd)pyrene	0.2 U	ug/l	ELA
1.0	Naphthalene	1.0 U	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	1.0 U	ug/l	ELA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by :



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PAH's by HPLC

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: EPA 8310

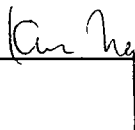
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Client Sample ID : B189-MW02-GW-01  
Date Sampled : 02/24/1999  
Date Extracted : 03/01/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
5	Acenaphthene	5 U	ug/l	ELA
5	Acenaphthylene	5 U	ug/l	ELA
5	Anthracene	5 U	ug/l	ELA
0.2	Benzo(a)anthracene	0.2 U	ug/l	ELA
0.25	Benzo(a)pyrene	3.04	ug/l	ELA
0.2	Benzo(b)fluoranthene	0.2 U	ug/l	ELA
0.2	Benzo(ghi)perylene	6.2	ug/l	ELA
0.25	Benzo(k)fluoranthene	0.25 U	ug/l	ELA
0.20	Chrysene	3.84	ug/l	ELA
0.2	dibenzo(ah)anthracene	0.2 U	ug/l	ELA
1.0	Fluoranthene	3.1	ug/l	ELA
1.0	Fluorene	1.0 U	ug/l	ELA
0.2	Indeno(123cd)pyrene	1.4	ug/l	ELA
1.0	Naphthalene	1.0 U	ug/l	ELA
1.0	1-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	2-Methyl naphthalene	1.0 U	ug/l	ELA
1.0	Phenanthrene	1.0 U	ug/l	ELA
1.0	Pyrene	1.0 U	ug/l	ELA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by :



# Quality Control Report for Method Blank

## PAH's by HPLC

Matrix: Water

Lab Sample ID: RB-02-25-99

QC Batch ID: 9902PAH135

Result Units: ug/l

Analysis Date: 03/02/1999

Preparation Date: 02/25/1999

Method: EPA 8310

Analyst: ELA

Analyte	Result	Flag	Analyte	Result	Flag
Acenaphthene	5	U	Acenaphthylene	5	U
Anthracene	5	U	Benzo(a)anthracene	0.2	U
Benzo(a)pyrene	0.25	U	Benzo(b)fluoranthene	0.2	U
Benzo(ghi)perylene	0.2	U	Benzo(k)fluoranthene	0.25	U
Chrysene	0.20	U	dibenzo(ah)anthracene	0.2	U
Fluoranthene	1.0	U	Fluorene	1.0	U
Indeno(123cd)pyrene	0.2	U	Naphthalene	1.0	U
1-Methyl naphthalene	1.0	U	2-Methyl naphthalene	1.0	U
Phenanthrene	1.0	U	Pyrene	1.0	U

# Quality Control Report for Method Blank

## PAH's by HPLC

Matrix: Water

Lab Sample ID: RB-03-01-99

QC Batch ID: 9903PAH003

Result Units: ug/l

Analysis Date: 03/02/1999

Preparation Date: 03/01/1999

Method: EPA 8310

Analyst: ELA

Analyte	Result	Flag	Analyte	Result	Flag
Acenaphthene	5	U	Acenaphthylene	5	U
Anthracene	5	U	Benzo(a)anthracene	0.2	U
Benzo(a)pyrene	0.25	U	Benzo(b)fluoranthene	0.2	U
Benzo(ghi)perylene	0.2	U	Benzo(k)fluoranthene	0.25	U
Chrysene	0.20	U	dibenzo(ah)anthracene	0.2	U
Fluoranthene	1.0	U	Fluorene	1.0	U
Indeno(123cd)pyrene	0.2	U	Naphthalene	1.0	U
1-Methyl naphthalene	1.0	U	2-Methyl naphthalene	1.0	U
Phenanthrene	1.0	U	Pyrene	1.0	U

# Quality Control Report for LCS Analysis

## PAH's by HPLC

Matrix: Water

Lab Sample ID: LCS

QC Batch ID: 9902PAH135

LCS Units: ug/l

Analysis Date: 03/02/1999

Preparation Date: 02/25/1999

Method: EPA 8310

Analyst: ELA

Analyte	LCS Conc	LCS Result	Percent Recovery	Lower Control Limit	Upper Control Limit
Acenaphthene	50.0	36.0	72	60	120
Acenaphthylene	25.0	18.0	72	60	120
Anthracene	1.0	0.7	70	60	120
Benzo(a)anthracene	2.5	1.9	76	60	120
Benzo(a)pyrene	2.5	2.3	90	60	120
Benzo(b)fluoranthene	1.0	1.0	97	60	120
Benzo(ghi)perylene	4.0	3.7	92	60	120
Benzo(k)fluoranthene	1.0	0.9	92	60	120
Chrysene	2.5	2.1	83	60	120
dibenzo(ah)anthracene	10.0	10.9	109	60	120
Fluoranthene	2.5	2.0	79	60	120
Fluorene	5.0	3.6	72	60	120
Indeno(123cd)pyrene	2.5	2.1	84	60	120
Naphthalene	25.0	21.0	84	60	120
Phenanthrene	2.0	1.5	75	60	120
Pyrene	5.0	4.8	95	60	120

# Quality Control Report for LCS Analysis

## PAH's by HPLC

Matrix: Water

Lab Sample ID: LCS

QC Batch ID: 9903PAH003

LCS Units: ug/l

Analysis Date: 03/02/1999

Preparation Date: 03/01/1999

Method: EPA 8310

Analyst: ELA

Analyte	LCS Conc	LCS Result	Percent Recovery	Lower Control Limit	Upper Control Limit
Acenaphthene	50.0	32.0	64	60	120
Acenaphthylene	25.0	15.0	60	60	120
Anthracene	1.0	0.7	73	60	120
Benzo(a)anthracene	2.5	1.9	78	60	120
Benzo(a)pyrene	2.5	2.0	80	60	120
Benzo(b)fluoranthene	1.0	0.8	78	60	120
Benzo(ghi)perylene	4.0	2.6	64	60	120
Benzo(k)fluoranthene	1.0	0.8	77	60	120
Chrysene	2.5	2.0	78	60	120
dibenzo(ah)anthracene	10.0	7.6	76	60	120
Fluoranthene	2.5	1.9	76	60	120
Fluorene	5.0	3.4	67	60	120
Indeno(123cd)pyrene	2.5	2.1	82	60	120
Naphthalene	25.0	15.0	60	60	120
Phenanthrene	2.0	1.4	72	60	120
Pyrene	5.0	3.9	78	60	120

# Quality Control Report for Spike Analysis

## PAH's by HPLC

Matrix: Water

Lab Sample ID: 9902188-1

QC Batch ID: 9902PAH135

Spike Units: ug/l

Analysis Date: 03/02/1999

Preparation Date: 02/25/1999

Method: EPA 8310

Analyst: ELA

Analyte	Spike Amount	Sample Result	Spike Result	Percent Recovery	Lower Control Limit	Upper Control Limit
Acenaphthene	50.0	0.0	28.5	57	45	133
Acenaphthylene	25.0	0.0	14.0	56	45	133
Anthracene	1.0	0.0	0.5	54	45	133
Benzo(a)anthracene	2.5	0.0	1.9	77	45	133
Benzo(a)pyrene	2.5	0.0	1.9	74	45	133
Benzo(b)fluoranthene	1.0	0.0	1.1	106	45	133
Benzo(ghi)perylene	4.0	0.0	2.9	74	45	133
Benzo(k)fluoranthene	1.0	0.0	0.8	76	45	133
Chrysene	2.5	0.0	1.9	74	45	133
dibenzo(ah)anthracene	10.0	0.0	10.1	101	45	160
Fluoranthene	2.5	0.0	1.6	65	45	133
Fluorene	5.0	0.0	3.0	59	45	133
Indeno(123cd)pyrene	2.5	0.0	2.2	86	45	133
Naphthalene	25.0	0.0	16.4	66	45	133
Phenanthrene	2.0	0.0	1.3	63	45	133
Pyrene	5.0	0.0	3.6	73	45	133

# Quality Control Report for Spike Analysis

## PAH's by HPLC

Matrix: Water

Lab Sample ID: 9902206-4

QC Batch ID: 9903PAH003

Spike Units: ug/l

Analysis Date: 03/02/1999

Preparation Date: 03/01/1999

Method: EPA 8310

Analyst: ELA

Analyte	Spike Amount	Sample Result	Spike Result	Percent Recovery	Lower Control Limit	Upper Control Limit
Acenaphthene	50.0	0.0	37.5	75	45	133
Acenaphthylene	25.0	0.0	18.8	75	45	133
Anthracene	1.0	0.0	0.9	92	45	133
Benzo(a)anthracene	2.5	0.0	2.3	93	45	133
Benzo(a)pyrene	2.5	0.0	2.3	92	45	133
Benzo(b)fluoranthene	1.0	0.0	0.9	91	45	133
Benzo(ghi)perylene	4.0	0.0	2.9	72	45	133
Benzo(k)fluoranthene	1.0	0.0	0.9	95	45	133
Chrysene	2.5	0.0	2.3	93	45	133
dibenzo(ah)anthracene	10.0	0.0	9.3	93	45	160
Fluoranthene	2.5	0.0	2.3	90	45	133
Fluorene	5.0	0.0	4.0	81	45	133
Indeno(123cd)pyrene	2.5	0.0	2.8	111	45	133
Naphthalene	25.0	0.0	18.8	75	45	133
Phenanthrene	2.0	0.0	1.7	86	45	133
Pyrene	5.0	0.0	5.0	100	45	133

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Petroleum Hydrocarbons

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: FL-PRO

Lab Reference Number : 99020249-1  
Client Sample ID : B189-MW13D-GW-01  
Date Sampled : 02/23/1999  
Date Extracted : 03/02/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
0.1	Total PHS	0.1 U	mg/l	SGA
	(Surr) C-39 (%)	102	%	SGA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRS Certification # E83239/83353

Reviewed by : 

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Petroleum Hydrocarbons

CLIENT NAME: Tetra Tech NUS, Inc.  
PROJECT NAME: Truman Annex Bld. 189  
PROJECT NUMBER: 7846  
DATE RECEIVED: 02/25/1999  
ANALYTICAL PROTOCOL: FL-PRO

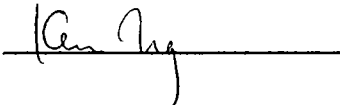
Lab Reference Number : 99020249-2  
Client Sample ID : B189-MW03-GW-01  
Date Sampled : 02/23/1999  
Date Extracted : 03/02/1999  
Date Analyzed : 03/02/1999  
Sample Matrix (as Received): Water  
Analysis Confirmed : No  
Dilution Factor : 1

MDL	Analyte	Results/Flag	Units	Analyst
0.1	Total PHS	0.1 U	mg/l	SGA
	(Surr) C-39 (%)	89	%	SGA

U = Undetected. The value preceeding the 'U' is the MDL for the analyte, based on dilution. Results reported on a Wet Weight basis.

FDEP CompQAPP # 900134G - FHRs Certification # E83239/83353

Reviewed by :



# Quality Control Report for Spike Analysis

## Petroleum Hydrocarbons

Matrix: Water

Lab Sample ID: 9901239-5

QC Batch ID: 9903FLRO008

Spike Units: mg/l

Analysis Date: 03/02/1999

Preparation Date: 03/02/1999

Method: FL-PRO

Analyst: SGA

Analyte	Spike Amount	Sample Result	Spike Result	Percent Recovery	Lower Control Limit	Upper Control Limit
(Surr) C-39	100.0	0.0	95.0	95	7	139
Total PHS	50.0	0.0	42.6	85	57	110